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New Hampshire Code of Administrative Rules
Env-Ws 379

PART Env-Ws 379 SITE SELECTION OF LARGE PRODUCTION WELLS FOR COMMUNITY WATER SYSTEMS

Env-Ws 379.01 Purpose. The purpose of these rules is to establish procedures and standards for the development of new large production wells for community water systems in order to ensure that these wells will be capable of consistently producing an adequate supply of water that meets drinking water quality standards.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.02 Applicability. These rules shall apply to wells that provide a new source of water for a community water system. This shall include new wells, reactivation of unused wells, wells deepened or otherwise improved to increase their capacity, and wells formerly removed from monitoring responsibility under Env-Ws 321.17.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.03 Definitions.

(a) "Acceptable water quality" means water that does not violate ambient groundwater quality standards established by RSA 485-C:6 or rules adopted pursuant thereto.

(b) "Applicant" means the supplier of water or their agent.

(c) "Approved yield" means the capacity necessary for design approval under Env-Ws 372 or Env-Ws 373 or their predecessors for community water supply systems.

(d) "Aquifer parameter value" means values of parameters which describe the physical properties of the aquifer such as transmissivity and hydraulic boundary conditions.

(e) "Available drawdown" means the distance between the water level in the well casing and the uppermost productive water bearing zone, the pump intake, or the top of the screen, whichever distance is least.

(f) "Background well" means a monitoring well outside the expected area of influence of the test well which serves to identify regional, background conditions throughout the pumping test program.

(g) "Bedrock production well" means a well which draws water from fractures in any consolidated material.

(h) "Community water system" means "community water system" as defined in 485:1-a, i, namely "a public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents."

(i) "Cone of depression" means a depression in the potentiometric surface of a body of

groundwater that has the general shape of an inverted cone and develops around a well from which water is being withdrawn.

(j) "Confined aquifer" means an aquifer in which groundwater is under pressures greater than the atmospheric pressure, which results in groundwater within a borehole rising to a level which is higher than the level at which water is first encountered, and which receives negligible recharge from overlying deposits during pumping.

(k) "Conceptual hydrogeologic model" means a description of geology, aquifer hydraulics, and recharge patterns which incorporates published information, available field data, and conservative assumptions for the study area.

(l) "Conservative assumption" means an assumption made during analyses required for a new well siting which results in the larger wellhead protection area and/or lower permitted production volume.

(m) "Constant pumping rate" means a pumping rate that does not vary by greater than 5% after the first 6 hours of pumping.

(n) "Contaminants" means substances that degrade the natural water quality as a result of human activities.

(o) "Contributing area" means "contributing area" as defined in RSA 485-C:2,IV. The term includes the area of land surface above the subsurface volume from which groundwater flows to a pumping well.

(p) "Department" means the department of environmental services.

(q) "Final report" means the report submitted to the department after the pumping test and water quality sampling programs are conducted at the proposed well site.

(r) "Flow net" means a map showing lines of equal hydraulic head with lines showing the direction of groundwater flow such that the amount of groundwater flow through all sections of the net is equal.

(s) "Groundwater" means "groundwater" as defined in RSA 485-C:2, VIII namely, "subsurface water that occurs beneath the water table in soil and geologic formations."

(t) "Hydrogeology" means the study of the occurrence, movement, and chemical nature of surface water and groundwater in relation to its geologic environment.

(u) "Known contamination source" means a land use from which contaminants are known to emanate and degrade groundwater quality.

(v) "Large overburden production well" means a production well that produces a permitted production volume of equal to or greater than 57,600 gallons which is exposed to and draws water from any type of unconsolidated material, including but not limited to, sand and gravel deposits. The term includes dug wells, tubular wells, well points, and naturally developed gravel wells.

(w) "Large bedrock production well" means a production well that produces a permitted production volume equal to or greater than 57,600 gallons and which is exposed to and draws water from any type of consolidated material.

(x) "Monitoring well" means a well used to observe or sample groundwater.

(y) "New well" means any well without current design approval in accordance with Env-Ws 372 or Env-Ws 373 or any well that has been inactive and has not been regularly sampled under the system's chemical monitoring program or any well that is deepened or otherwise improved to increase its approved yield.

(z) "Permitted production volume" means the maximum volume of groundwater allowed by the department to be withdrawn or pumped from a public water supply production well in a 24-hour period.

(aa) "Porous media assumption" means groundwater flow that conforms to Darcy's Law, mainly flow through porous media which is laminar and of low velocity.

(ab) "Potentiometric surface" means the surface where groundwater pressure is equal to atmospheric pressure.

(ac) "Potential contamination source" means human activities or operations that pose a risk that regulated contaminants might be introduced into the environment in such quantities as to degrade the natural groundwater quality. The term includes those land uses listed in RSA 485-C:7,II.

(ad) "Preliminary report" means the report submitted to the department prior to conducting the pumping test and water quality programs at the proposed well site.

(ae) "Production well" means a well designed and constructed to withdraw groundwater for a community water supply system.

(af) "Pumping test production rate" means the constant pumping rate that is maintained throughout the pumping test which is used to establish the permitted production volume.

(ag) "Regulated contaminant" means "regulated contaminant" as defined in RSA 485-C:2, XIII namely "any physical, chemical, biological, radiological substance or other matter, other than naturally occurring substances at naturally occurring levels, in water which adversely affects human health or the environment."

(ah) "Supplier of water" means a "supplier of water" as defined under RSA 485:1-a, XVI namely "any person who controls, owns or generally manages a public water system."

(ai) "Surface water" means "surface waters of the state" as defined in RSA 485-A:2, XIV, namely "streams, lakes, ponds and tidal waters within the jurisdiction of the state, including all streams, lakes, or ponds bordering on the state, marshes, water courses and other bodies of water, natural or artificial."

(aj) "Test well" means a well used during a pumping test from which groundwater is withdrawn or pumped which may or may not become the production well.

(ak) "Well" means any conveyance used to capture or withdraw water from the ground.

(al) "Wellhead protection area" means "wellhead protection area" as defined in RSA 485-C:28, XVIII namely "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield". The term includes the contributing area for production wells which supply community water systems.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.04 Requirements for New Large Production Wells.

(a) Except where a waiver has been obtained for a particular requirement in accordance with Env-Ws 379.26, before connecting a large production well to a community water system, the applicant shall complete all of the following:

(1) Provide information demonstrating that the production well location complies with surface water related setbacks in accordance with Env-Ws 379.05;

(2) Provide information demonstrating that the land use within the sanitary protective area will be under the direct control of the water system and that the area will be in a natural state in accordance with Env-Ws 379.06;

(3) Develop a conceptual hydrogeologic model of the aquifer, wellhead protection area, and potential impacts in accordance with Env-Ws 379.07;

(4) Prepare a preliminary estimate of the wellhead protection area and propose a method for refining the estimate in accordance with Env-Ws 379.08;

(5) Prepare preliminary contamination source and water user inventories in accordance with Env-Ws 379.09;

(6) Identify and evaluate any known sources of contamination in accordance with Env-Ws 379.10;

(7) Prepare a proposal for a pumping test in accordance with Env-Ws 379.11;

(8) Prepare a proposal for a water quality sampling program in accordance with Env-Ws 379.12;

(9) Submit a preliminary report prepared in accordance with Env-Ws 379.13, to provide, before significant resources are expended, an early assessment of the appropriateness of the site for a community water supply well and to help ensure the work being proposed will be consistent with these and other department rules;

(10) Receive department approval of the preliminary report in accordance with Env-Ws 379.14;

(11) Upon receipt of department approval of the preliminary report, perform the

pumping test and water quality sampling program in accordance with Env-Ws 379.15;

(12) Demonstrate that acceptable water quality can be continuously delivered to the community water system provided that, for parameters which exceed secondary maximum contaminant levels under Env-Ws 310-319, treatment or other management techniques may be used when approved by the department in accordance with Env-Ws 340-349;

(13) Establish the permitted production volume in accordance with Env-Ws 379.16;

(14) Refine the wellhead protection area delineation in accordance with Env-Ws 379.17;

(15) Update and revise the contamination source and water withdrawal inventory in accordance with Env-Ws 379.18;

(16) Establish a contamination source control program in accordance with Env-Ws 379.19 for any known source of contamination evaluated in accordance with Env-Ws 379.10;

(17) Establish a wellhead protection program in accordance with Env-Ws 379.20;

(18) Provide information demonstrating the well is in compliance with water well board construction criteria in accordance with Env-Ws 379.21;

(19) Submit a final report to the department in accordance with Env-Ws 379.22;

(20) Obtain department approval of the new well in accordance with Env-Ws 379.23; and

(21) After new well approval has been obtained, obtain approval to connect the new well to the community water system under Env-Ws 372 for small community water systems and Env-Ws 373 for all other community water systems.

(b) Within one week of the well being connected to the water system and operational, the applicant shall submit a written request for a chemical monitoring schedule for conducting ongoing monitoring and reporting in accordance with Env-Ws 320-339.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.05 Well Location Relative to Surface Water.

(a) A well shall not be placed within 50 feet of the high water line of any surface water, unless a waiver is obtained in accordance with Env-Ws 379.26.

(b) The well shall not be subject to flooding at the 100-year recurrence interval. The applicant may fill to elevate the wellhead and pumping station for flood protection purposes, provided that all required permits for placing of fill within wetlands and flood plains have been

obtained.

(c) A description of the 100-year flood elevation, the floodplain location, and the nearby surface waters shall be provided in the preliminary and final reports.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.06 Sanitary Protective Area.

(a) The purpose of the sanitary protective area is to provide an area in the immediate vicinity of the well within which there is minimal risk of groundwater contamination.

(b) The sanitary protective area shall be a circle, centered on the well, with a radius based on the permitted production volume of the well as set forth in Table 379-1:

Table 379-1 Sanitary Protective Area Radii

Permitted Production Volume (gallons)	Radius
less than 14,400	150 feet
14,401 to 28,800	175 feet
28,801 to 57,599	200 feet
57,600 to 86,400	250 feet
86,401 to 115,200	300 feet
115,201 to 144,000	350 feet
greater than 144,000	400 feet

(c) When more than one well is inside a sanitary protective area, then the individual sanitary protective areas for these wells shall be based on the combined permitted production volume of the wells unless it is proven they are not interconnected.

(d) The water supplier shall own the land within the sanitary protective area, provided however that if the supplier does not own and cannot purchase the land, the supplier shall control the land by perpetual easement.

(e) The sanitary protective area shall be maintained in a natural state except for structures and activities necessary for the maintenance of the well.

(f) Land uses or activities within the sanitary protective area shall be only those necessary for the maintenance and operation of the well and shall not pose a contamination risk to the groundwater.

(g) The discharge of collected drainage from areas where fertilizer and pesticide have been applied or from roadways or developed areas shall be prohibited in the sanitary protective

area.

(h) No underground utilities shall be installed in the sanitary protective area except for potable water and electrical or communications conduits.

(i) A description of land use activities and how the sanitary protective area is or will be controlled by the water supplier shall be presented in the preliminary and final reports, including:

(j) The description required by (i), above, shall include:

(1) A map that identifies lot lines and the owner of every lot into which the radius extends;

(2) The existing and proposed land uses and activities associated with the area;

(3) The means by which the water system will obtain and maintain control of land uses in the sanitary protective area; and

(4) A sketch of the well site within 500 feet of the well at a scale of one inch equals 100 feet, which shows:

a. The proposed well location;

b. All property lines and any easements;

c. All land uses, including any paths, trails, structures, storage, landscaping, or other alteration of the natural terrain;

d. Any surface water or wetlands; and

e. The sanitary protective area.

(k) Documentation of legal control of the sanitary protective area shall be provided in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.07 Conceptual Hydrogeologic Model.

(a) A conceptual hydrogeologic model of the source of water for the proposed well shall be developed by a person who, by education and experience in hydrogeology, is able to quantitatively analyze and interpret hydrogeology.

(b) The conceptual hydrogeologic model shall:

(1) Identify the sources of information used;

(2) Provide an explanation of how interpretations were made; and

(3) Include the following:

a. A description of the geology and geologic history of the area;

b. Generalized geologic cross-sections through the aquifer based on available information such as well logs, geologic reports, maps, and subsurface data;

c. A description of:

1. Aquifer flow;

2. Hydraulic boundaries;

3. Recharge conditions;

4. The interaction of the source of the withdrawal with surrounding water resources; and

5. The estimated zone of contribution; and

d. A conceptual groundwater flow net map for the aquifer and its recharge areas within a one mile radius of the proposed withdrawal based on available data, which shall show:

1. Hydraulic head contours; and

2. Groundwater flow directions in both horizontal and vertical planes, under average, ambient, non-pumping conditions for the aquifer being considered and its recharge areas.

(c) The conceptual hydrogeologic model shall be refined based on results of the pumping test performed in accordance with Env-Ws 388.15 and shall be presented in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.08 Preliminary Estimate of the Wellhead Protection Area and Proposed Method for Refinement for Large Production Wells.

(a) The intent of estimating the wellhead protection area is to identify an area through which groundwater is likely to reach the well and within which potential and known contamination sources should be identified to determine the appropriateness of the well site.

(b) For all large overburden production wells and for large bedrock production wells with permitted production volumes less than 216,000 gallons, the applicant shall present, in the preliminary report, a preliminary estimate of the wellhead protection area and a detailed proposal for performing either a standard method for refinement or an alternative method for refinement.

(c) For large bedrock production wells with permitted production volumes equal to or greater than 216,000 gallons, the applicant shall present in the preliminary report:

(1) A preliminary estimate of the wellhead protection area; and

(2) A detailed proposal for a method for refinement that will produce a wellhead protection area that is based on site specific data and conservative assumptions, such as the wellhead protection area produced for large overburden production wells using the standard method pursuant to Env-Ws 379.08(e).

(d) The preliminary estimate of the wellhead protection area for all large production wells shall be derived by drawing a circle with a 4000 foot radius around the well, or when sufficient data is available, by using the standard refinement method defined by Env-Ws 379.08(e).

(e) The standard refinement for wellhead protection area refinement for large overburden wells shall be either a flow net technique or a hydrogeologic mapping technique as specified in Env-Ws 379.08(f), (g) or (h).

(f) The flow net technique shall be used for unconfined wells where there is sufficient existing information to construct a flow net, including:

(1) The calculation of a cone of depression for groundwater being withdrawn at the pumping test production rate for a period of 180 days with no net recharge;

(2) The construction of an ambient regional potentiometric surface map;

(3) The construction of an ambient regional potentiometric surface map with the calculated cone of depression superimposed upon it;

(4) The construction of a flow net for the map with the superimposed cone of depression, in which contours are reported in feet or meters referenced to the national geodetic vertical datum;

(5) The delineation of the wellhead protection area as that area from which flow lines reach the well;

(6) The extension of the wellhead protection area up gradient to a groundwater divide;

(7) Identification of the recharge mechanisms in the wellhead protection area that will support the proposed permitted production volume; and

(8) Refinement of the wellhead protection area with respect to no flow boundaries, surface waters, existing pumping wells, well interference, and any other hydraulic influences.

(g) The hydrogeologic mapping technique shall be used when:

(1) Sufficient regional potentiometric information is not reasonably available to construct a flow net for delineating the wellhead protection area for large overburden production wells; or

(2) An aquifer is sufficiently confined such that the method described in Env-Ws 379.08(a) through (f) would not be technically correct.

(h) The hydrogeologic mapping technique shall be a contributing area analysis based on:

(1) The surface watershed boundaries within which the production well is contained;

(2) The surface water elevations where applicable;

(3) The pumping test data;

(4) The geologic maps;

(5) The soil maps;

(6) The topographic maps; and

(7) All other available information relative to delineation of a wellhead protection area.

(i) The standard refinement method for large bedrock production wells with permitted production volumes less than 216,000 gallons, shall be a contributing area analysis based on the following hydrogeologic information:

(1) Hydrogeologic mapping information including lineament and bedrock mapping performed by the United States Geologic Survey;

(2) Recharge mechanisms and areas; and

(3) Hydraulic influences including:

a. No flow boundaries;

b. Surface waters;

c. Existing pumping wells, and

d. Well interference.

(j) An alternative wellhead protection area refinement method shall be an analytical or numerical model which incorporates aquifer parameter values derived from the pumping test providing that the models assumptions are not violated and conservative estimates of aquifer parameter values are used. The use of model's that rely on porous media assumptions shall only be allowed for use with a bedrock well if those assumptions are demonstrated to be valid for the well site.

(k) The wellhead protection area refinement proposal shall include:

(1) A description of the preliminary estimate of the wellhead protection area completed in accordance with Env-Ws 379.08(d);

(2) A map of the well location showing the preliminary estimate of the wellhead protection area on an original or a color copy of a United States Geologic Survey topographic quadrangle at a scale of 1:24,000 or 1:25,000, which includes the quadrangle title, scale and date;

(3) A detailed description of the proposed method for refinement; and

(4) A description of how the refinement will be documented in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.09 Preliminary Contamination Source and Water User Inventories.

(a) Preliminary contamination source and water use inventories of the wellhead protection area shall be:

(1) Completed before the pumping test and water quality sampling program proposals required in accordance with Env-Ws 379.11 and Env-Ws 379.12 are developed.

(2) Included in the preliminary report;

(3) Revised and updated for the final report in accordance with Env-Ws 379.18; and

(4) Compiled from a search of the following information sources:

a. Records at the department;

b. Records at the municipality; and

c. A windshield survey of all properties within the estimated wellhead protection area.

(b) The contamination source inventory shall:

(1) Identify and describe known and potential contamination sources in the estimated wellhead protection area;

(2) Include the following information for each known and potential source of contamination:

a. The site name and address;

b. The property owner(s) or operator(s) name, address, and telephone number;

c. For each known source of contamination, a description of the nature, extent and investigation, and remedial action status of the contamination; and

d. For each potential source of contamination, the type of potential contamination sources at the facility as defined in RSA 485-C:7, III.

(c) The water user inventory shall:

(1) Identify other water users that may be impacted by the new well including private wells within 1000 feet and public wells and registered water withdrawals in the estimated wellhead protection area; and

(2) Include the following information:

a. A description of each private well, assuming that all developed lots not served by a public water system have private wells, including:

1. The property address; and

2. Water uses observed during the windshield survey;

b. A description of each public well including:

1. The water system name and address;

2. The wells federal identification number; and

3. The average water use; and

c. A description of each water withdrawal registered in accordance with Env-Wr 700 including:

1. The name and address of the withdrawer;

2. The type of use; and

3. The average water use.

(d) An inventory map showing the location of the contamination sources and water users inventoried within the wellhead protection area shall:

(1) Be presented in the preliminary and final reports;

(2) Have, as its base, an original or a clear color copy of a United States Geological Survey topographic quadrangle map at a scale of 1:24000 or 1:25000; and

(3) Include the following information:

a. The estimate of the wellhead protection area; and

b. The title, scale, and date of the quadrangle.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.10 Known Contamination Source Evaluation.

(a) The applicant shall review the applicable department site file(s) on each known contamination source identified in accordance with Env-Ws 390.09 and evaluate its potential to degrade water quality at the wellhead.

(b) The applicant shall present in the preliminary report a description of how these sites will be addressed by the pumping test and water quality sampling proposal required in accordance with Env-Ws 390.11 and Env-Ws 379.12.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.11 Proposal for Pumping Test Program for Large Production Wells.

(a) For all large overburden production wells and for large bedrock production wells with permitted production volumes less than 216,000 gallons, the applicant shall present, in the preliminary report, a detailed proposal for performing either a standard pumping test or an alternate pumping test.

(b) For large bedrock production wells with permitted production volumes equal to or greater than 216,000 gallons, the applicant shall present, in the preliminary report, a detailed proposal for a pumping program that provides data for predicting a sustainable yield and a wellhead protection area on the basis of site specific data and conservative assumptions.

(c) The pumping test program shall be conducted to gather the information necessary to:

(1) Demonstrate that the permitted production volume is sustainable;

(2) Demonstrate that acceptable water quality can be consistently delivered;

(3) Assess impacts to surrounding water resources;

(4) Develop contamination control programs for any known sources of contamination;

(5) Perform the refinement of the wellhead protection area and to justify the selected refinement methodology; and

(6) Demonstrate the system source capacity required by Env-Ws 370-377.

(d) An alternate pumping test shall:

(1) Meet or exceed the requirements of the standard pumping test; and

(2) Be verified, using pumping test data, in the final report as appropriate for site conditions.

(e) A standard pumping test shall meet the following criteria:

(1) The pumping test shall consist of 3 periods, as follows:

a. The antecedent period, during which non-pumping conditions are monitored, starting 7 days immediately preceding the start of pumping;

b. The pumping period, which shall be as follows:

1. For all large overburden production wells, the pumping period shall be for 5 days or until the water level at the pumping well, or at the nearest observation well within 5 feet of the pumping well, has changed less than

0.05 feet in 24 hours, whichever occurs first, except that the pumping period shall not be less than 48 hours in duration;

2. For large bedrock production wells with permitted production volumes less than 216,000 gallons, the pumping period shall be for at least 72 hours; and

3. For large bedrock production wells with permitted production volumes less than 216,000 gallons, the pumping period pumping shall be for 7 days unless, after 72 hours, one of the following conditions exist:

(i) The water level in the pumping well has fluctuated less than 0.05 feet in 24 hours; or

(ii) A theoretical 180-day drawdown does not exceed 90% of the total available drawdown at the time of the test, or 5 feet, whichever is greater, and is derived using the following methodology:

i. Water level data shall be plotted as a semi-logarithmic plot of drawdown versus elapsed time in minutes, with time on the logarithmic axis;

ii. Elapsed time shall be the number of minutes elapsed since pumping began;

iii. A straight line shall be drawn through the data on the semi-logarithmic plot;

iv. The line shall be drawn with a slope based on the data points from the end of the pumping period; and

v. The drawdown indicated by that line for a time of 180 days, or 259,200 minutes, shall be the theoretical 180-day drawdown; and

c. The recovery period, during which the aquifer system recovers from the stress of pumping beginning immediately at shut-down of the pumping well and continuing until the water level in the pumping well or the nearest well within five feet of the pumping well has recovered 95%;

(2) The pumping of and discharge from the test well and the system's other production wells shall be as follows:

a. The pumped water shall be discharged outside the contributing area of operating wells so there is no effect on the aquifer's response to pumping;

b. The pumping rate in the test well shall be recorded at least as often as water level measurements, after the first 10 minutes of pumping;

c. The discharge rate from the test well shall be measured using a circular

orifice weir or other device which provides measurements of equal precision;

d. The discharge from other system wells shall be measured using cumulative flow meters;

e. The test well shall be pumped at a single, constant rate that when multiplied by 24 hours produces the proposed permitted production volume in accordance with Env-Ws 379.12; and

f. The system's other wells shall be operated continually, at constant rates during the pumping period unless data is provided which shows these wells will not affect aquifer response to pumping the proposed production well;

(3) Groundwater level measurements shall be made:

a. To the nearest 0.01 foot;

b. At the following locations:

1. The test well;

2. The water system's other production wells;

3. One background monitoring well located outside the expected influence of the test well;

4. For large overburden production wells, at least 4 monitoring wells within the expected area of influence of the test well; and

5. For large bedrock production wells with permitted production volumes less than 216,000 gallons, at such locations as to gather sufficient site specific information such as that obtainable from monitoring wells or geophysical techniques;

c. During the antecedent period, twice daily in the background well, test well and one selected monitoring well, when such wells are used in a pumping test program;

d. During the pumping period, beginning at one minute after the start of pumping until shut down, so that at least 10 data points per log cycle of time in minutes are recorded for the test well and selected monitoring wells; and

e. During the recovery period, beginning at one minute after shut down of the pump until the end of the recovery period, so that at least 10 data points per log cycle of time, in minutes, are recorded for the test well and selected monitoring wells.

(4) Surface water levels in waters within 1000 feet of the pumping well shall be:

a. Collected twice daily throughout the pumping test program;

b. Measured to the nearest 0.01 foot; and

c. Monitored more frequently if the surface water elevation is affected by any dam or other control structure;

(5) Rainfall measurements shall be measured to the nearest 0.1 foot throughout the program at the well site;

(6) If the aquifer is subject to confining conditions, barometric pressure measurements shall be collected throughout the program at the well site;

(7) Site activities and weather conditions shall be observed and logged at the site throughout the program; and

(8) Data analyses and presentation shall include, at a minimum, the following information:

a. A table of the time elapsed since pumping began and;

1. The pumping rate;

2. The recorded groundwater levels;

3. The groundwater levels corrected for other hydraulic influences;

4. The surface water level; and

5. The rainfall data;

b. A daily log of site activity and weather conditions;

c. Plots of recorded and corrected water level data versus time, as log-log and semi-logarithmic graphs, with time plotted on the logarithmic axis, in each of the following formats:

1. Drawdown versus time, with time expressed in minutes of elapsed time, plotted on the logarithmic axis; and

2. Recovery versus time, with time expressed in minutes of elapsed time, plotted on the logarithmic axis;

d. Semi-logarithmic plots of drawdown at the end of pumping versus distance plotted with distance on the logarithmic axis, specifying well names with all data points;

e. For large overburden wells, the analysis and presentation shall also include:

1. Estimates of transmissivity and storage coefficient based on time-drawdown and distance-drawdown plots; and

2. An explantion of the estimating method, presented in the final report, which is based on a comparison of the assumptions underlying the method

and aquifer characteristics observed during the pumping test;

f. A plan of the well site constructed as follows:

1. The plan shall be at a scale of one inch equals 100 feet;

2. The plan shall clearly show the locations of all measurements taken;

3. Any surface water in the study area shall be identified;

4. The sanitary protective area shall be shown;

5. Any paths, roadways, structures or other uses inside or adjacent to this area shall be clearly shown and described; and

g. A table of the horizontal distance between observation points and the pumping well.

(f) The proposal for the standard pumping test shall include the following:

(1) The proposed pumping test production rate;

(2) A site sketch showing locations of:

a. Monitoring wells;

b. Surface water staff gauges; and

c. Discharge locations;

(3) A description of and justification for monitoring well layout, construction, and screening;

(4) An outline of borehole drilling and sediment sampling techniques;

(5) A table showing the schedule for monitoring well and surface water level measurements;

(6) A description of the construction of any surface water level staff gages;

(7) The information demonstrating the discharge location is appropriate;

(8) A description of the method and equipment that will be used to ensure a constant pumping rate is maintained;

(9) A schedule for measurement of discharge;

(10) The anticipated operating schedule for nearby wells identified in Env-Ws 379.09;

(11) A description of how any other of the system's wells will be operated while the new well is being tested;

(12) The anticipated pumping test duration and criteria for pump shut down;

(13) The test well construction and screening; and

(14) A description of proposed data analyses and presentation methods.

(g) For all large overburden production wells and large bedrock production wells with permitted production volumes less than 216,000 gallons, an alternative pumping test method is one which differs from the standard method and meets the objectives of the pumping test in accordance with Env-Ws 379.11(c) and the following criteria:

(1) The pumping test provides data necessary for the proposed wellhead protection area delineation method;

(2) The pumping test will produce results which are superior or equivalent to the results obtained using the standard method; and

(3) The pumping test method is justified in the final report based on observations collected during the pumping test program.

(h) The proposal for an alternative pumping test shall include the same material required for the standard under Env-Ws 379.11(f) and information demonstrating the program will meet or exceed the requirements for the standard pumping test.

(i) Additional monitoring wells shall be required when necessary to meet the objectives of the pumping test.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.12 Proposal for Water Quality Testing.

(a) The applicant shall present in the preliminary report a detailed proposal for water quality testing.

(b) The water quality sampling program shall be conducted to gather the information necessary to establish acceptable water quality and develop, if necessary, a contamination control program for the desired permitted production volume.

(c) A water quality testing program shall include the collection of 3 water quality samples during the pumping test program at each of the following times during the pumping period:

(1) Between the first and the fifth hour of the pumping period;

(2) Midway through the pumping period; and

(3) At the end of the pumping period, one hour or less before the pump is shut off.

(d) The first 2 water quality samples taken during the pumping test performed on large overburden wells shall be analyzed for the following parameters:

(1) Volatile organic compounds;

(2) Iron;

(3) Manganese;

(4) pH;

(5) Specific conductance;

(6) Hardness;

(7) Chlorides;

(8) Sodium; and

(9) Nitrates.

(e) The third sample shall be analyzed for those parameters required to be monitored in groundwater systems per Env-Ws 310-319.

(f) Additional analyses shall be conducted if review of the preliminary report indicates the possible presence of contamination sources.

(g) Analyses shall be performed by a laboratory which is certified in accordance with Env-C 300, and all analyses shall be performed in accordance with Env-C 300.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.13 Preliminary Report.

(a) A preliminary report, which shall provide a preliminary assessment of the appropriateness of the well site, shall be prepared and submitted to the department in accordance with Env-Ws 379.04(a)(9).

(b) The preliminary report shall contain:

(1) The information and materials required in accordance with Env-Ws 379.05 through Env-Ws 379.12;

(2) A project description that includes the names, mailing addresses, and telephone numbers of the following individuals:

a. The water system owner;

b. The owner of the well site;

c. The person responsible for responding to questions from the department regarding the preliminary report; and

d. The person responsible for performing the pumping test and water quality sampling programs;

(3) A description of who is or will be served by the system and why a new well is being sited;

(4) The well capacity requirements for the system, a proposed permitted production volume for the project, and a description of how these values were derived;

(5) A description of the current use and 50 year history of the property where the pumping test is to be conducted; and

(6) A report of available information on the quality of surface and groundwater within the wellhead protection area.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.14 Criteria and Procedures for Approval or Denial of the Preliminary Report.

(a) The department shall approve or deny the preliminary report in writing within 60 days.

(b) The department shall approve the preliminary report upon determining the following criteria are met:

(1) The report contains all information required by Env-Ws 379.13; and

(2) The information contained in the report is complete and correct.

(c) If the report is deficient in any of the criteria in Env-Ws 379.14(b), above, the applicant shall be so notified in writing within 60 days.

(d) The department shall deny the preliminary report upon determining the following criteria are met:

(1) The report does not contains all information required by Env-Ws 379.11; and

(2) The information contained in the report is incorrect or incomplete.

(e) The department shall advise the applicant not to proceed further in the well siting process if information concerning known contamination sources evaluated in accordance with Env-Ws 379.09 indicates that an adequate contamination control program can not be implemented to prevent degradation of water quality at the well.

(f) The department shall advise the applicant when, based on the information provided in the preliminary report, a waiver will be required for a specific requirement under these rules.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.15 Performing the Pumping Test and Water Quality Sampling.

(a) The pumping test shall be performed in accordance with the pumping test proposal approved in the preliminary report unless department approval is obtained to alter the pumping test program.

(b) The department shall be notified of the anticipated start date, at least one week prior to the start of the pumping test.

(c) The pumping test shall be supervised by a person who, by education and experience in hydrogeology, is able to quantitatively analyze and interpret hydrogeology.

(d) The pumping test shall be postponed or prolonged if high recharge conditions prohibit the ability to use test data to meet the intent of this rule. This determination shall be made based on site specific conditions at the time of testing. Where postponing or prolonging the test is not reasonably feasible, justification shall be provided to the department and data adjusted using conservative assumptions to reflect average conditions.

(e) The water quality sampling shall be performed in accordance with the proposal contained in the preliminary report unless department approval to alter the proposal is obtained.

(f) The pumping test and water quality sampling performed shall be described in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.16 Establishing the Permitted Production Volume.

(a) The permitted production volume shall be demonstrated by the constant rate pumping test completed in accordance with Env-Ws 379.15.

(b) The permitted production volume shall be the volume produced by pumping at the pumping test production rate for 24 continuous hours.

(c) The actual rate at which water is withdrawn from an approved well may vary, however, the permitted production volume shall not be exceeded.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.17 Wellhead Protection Area Refinement.

(a) The estimated wellhead protection area presented in the preliminary report shall be refined by the method described in the preliminary report unless department approval to alter the methodology is obtained.

(b) Approval to alter the method of wellhead protection area refinement shall be approved by the department if the method used results in a wellhead protection area that is

technically equal to or better than the wellhead protection area that the original method would have produced.

(c) The refinement performed shall be documented in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.18 Contamination Source and Water Withdrawal Inventory Update and Revision.

(a) The preliminary inventories of contamination sources and water withdrawals shall be updated and revised for the refined wellhead protection area in the following manner:

(1) For an area that was part of the estimated wellhead protection area, where less than 3 months has elapsed since the preliminary inventories were completed, the applicant shall contact the department to determine if there are any new sites located in that area and shall add those sites to the preliminary inventories for the final report;

(2) For an area that is in the revised wellhead protection area, which was not in the preliminary estimate, the applicant shall perform all the same procedures performed for the preliminary inventory in accordance with Env-Ws 379.09; and

(3) If more than 3 months has elapsed since the inventories were completed, the applicant shall repeat all the same procedures performed for the preliminary inventory in accordance with Env-Ws 379.09 for the entire revised wellhead protection area.

(b) The updated inventory shall be included in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.19 Contamination Control Program.

(a) The applicant shall establish a contamination control program which minimizes the risk of contamination from known sources of contamination.

(b) The program shall include provisions and a schedule for remediation and/or monitoring of residual contamination from all known contamination sources in the wellhead protection area to ensure that contamination will not reach the well. A known contamination source in compliance with the conditions of a groundwater management permit issued in accordance with Env-Wm 1403 shall constitute an adequate control program.

(c) A description of the contamination control program and supporting evaluations and documentation shall be provided in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-

Env-Ws 379.20 Wellhead Protection Program.

(a) For all large production wells, the applicant shall establish a wellhead protection program to manage potential contamination sources, which shall include:

(1) Updating of the inventories required by Env-Ws 379.09 and 379.18 at intervals no greater than 3 years;

(2) Sending written notification to the owner of each contamination source and potential contamination source listed in the inventory, at intervals no greater than 3 years, which notification shall include:

a. The name and address of the applicant and the location of the well;

b. A statement that the property is in a wellhead protection area;

c. A statement that the present use of the property is considered to have potential for groundwater contamination and identification of the listed present use;

d. A copy of Env-Ws 421, and the corresponding department fact sheet(s);

e. Notification that any unpermitted discharges to groundwater or contamination of groundwater is illegal under RSA 485-A:13; and

f. The name and phone number of a contact person and affiliated agency to call at the local level and at the state level with any questions about the program;

(3) Attempting to survey at least once every 3 years all potential contamination sources located within the wellhead protection area to ascertain compliance with best management practices for preventing groundwater contamination, except for pesticide application and agricultural operations;

(4) Defining the ability and intent of the applicant to implement and maintain the potential contamination source management program;

(5) Identification of an anticipated date when the wellhead protection area is to be reclassified to GAA per 485-C:9,II, if applicable; and

(6) Identification of the process, and schedule for adoption, if other local regulatory techniques are to be employed to authorize survey activity.

(b) For all large production wells, lack of an acceptable potential contamination source management program shall result in disapproval of a well site.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.21 Construction Design. The applicant shall demonstrate if the construction of the wellhead complies with We 600 and We 700. A copy of the well completion report prepared in accordance with We 800 shall be included in the final report.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.22 Final Report. The applicant shall obtain department approval of a final report containing all the information and material required in accordance with Env-Ws 379.05-379.21 and the following:

(a) The project description required in the preliminary report in accordance with Env-Ws 379.11, with updates and revisions that reflect changes in the project;

(b) The refined wellhead protection area estimate and documentation completed as proposed in accordance with Env-Ws 379.17;

(c) A description of the pumping test including:

(1) The data collected;

(2) A description of how each of the pumping test requirements in Env-Ws 379.11 were met; and

(3) If an alternate pumping test was performed, all data and analyses as proposed in the preliminary report;

(d) A description of the water quality sampling including the following:

(1) A report of the laboratory results for water quality;

(2) A description of water quality sample collection and transport methods, dates, and times;

(3) A copy of current State of NH laboratory certification(s) issued to the laboratory(s) performing the analysis; and

(4) Identification of any subcontracted analyses or subcontracted laboratories and a copy of their state certification;

(e) A proposed permitted production volume and a description of the means by which it was established in accordance with Env-Ws 379.16;

(f) An estimate of the effect pumping the permitted production volume from the well will have on the following:

(1) Water levels in private and public wells within 1000 feet of the pumping test well;

(2) Water levels in nearby surface waters and wetlands;

(3) Existing groundwater contamination plumes; and

(4) Saltwater intrusion into the freshwater aquifer; and

(g) Where a secondary maximum contaminant level is exceeded, a copy of department approval for a treatment or management plan in accordance with Env-Ws 310-330.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.23 Criteria for Approval or Denial of New Wells.

(a) Notwithstanding Env-Ws 379.23 (c) below, upon determining that the report required in accordance with Env-Ws 379.22 contains all the required information and that it is correct and complete, the department shall approve the well and notify the applicant in writing within 60 days of receiving the final report, that the well has been approved.

(b) If the report is deficient in any of the criteria in Env-Ws 379.23(a), above, the applicant shall be so notified in writing within 60 days of receiving the final report.

(c) The proposed well shall be denied under the following conditions:

(1) One or more contamination source is present in the wellhead protection area and the contamination control program prepared in accordance with Env-Ws 379.19 does not ensure that contamination will not degrade water quality at the well; and

(2) If the applicant has failed to perform any activity or to meet any of the requirements contained in these rules.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.24 Increasing the Permitted Production Volume.

(a) A large production well shall not be pumped at a rate which results in exceeding the permitted production volume determined in accordance with Ws 379.16 without prior written approval from the department.

(b) A request to increase the permitted production volume shall require the submission of the same information necessary for approval of a new well, and compliance with this chapter.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.25 Reducing the Wellhead Protection Area.

(a) A wellhead protection area determined in accordance with Env-Ws 379.17 shall not be reduced in size without prior department approval.

(b) A request to reduce the wellhead protection area shall be based on data analysis from a pumping test or other appropriate site specific data.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

Env-Ws 379.26 Waivers.

(a) The rules contained in this part apply to a variety of conditions and circumstances. It is recognized that strict compliance with all rules prescribed herein might not fit every conceivable situation. Suppliers of water may request a waiver of specific rules outlined in this part in accordance with paragraph (b) below.

(b) All requests for waivers shall be submitted in writing to the department and shall include the following information:

(1) A description of the site to which the waiver request relates;

(2) A specific reference to the section of the rule for which a waiver is being sought;

(3) A full explanation of why a waiver is necessary and demonstration of hardship caused if the rule is adhered to;

(4) A full explanation of the alternatives for which a waiver is sought with backup data for support; and

(5) A full explanation of how the alternatives for which a waiver is sought:

a. Are consistent with the intent of RSA 485:8 and RSA 485:48;

b. Would have a just result; and

c. Would adequately protect human health and the environment.

(c) The department shall approve a request for a waiver if it finds that the alternatives proposed are at least equivalent to the requirements contained in this part, and are adequate to ensure that the provisions of RSA 485:8, and RSA 485:48 are met.

(d) The department shall not grant any waiver which in its judgement contravenes the intent of any rule.

(e) The department shall issue a written response to a request for a waiver. If the waiver is denied, the denial shall specifically set forth the reason(s) for the denial.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97; ss by #6979, eff 4-21-99

PART Env-Ws 380 FILTRATION AND DISINFECTION

Env-Ws 380.01 Abbreviations.

(a) "C" means residual disinfectant concentration in mg/l.

(b) "CT" or "CTcalc" means the product of residual disinfectant concentration in mg/l determined before or at the first customer, and the corresponding disinfectant contact time in minutes, i.e., C x T.

(c) "CT99.9" means the CT value required for 99.9 per cent inactivation of giardia lamblia cysts as determined from Tables 380-2 through 380-9 in Env-Ws 380.22.

(d) "HPC" means heterotrophic plate count.

(e) "Mg/L" means concentration in milligrams per liter.

(f) "NTU" means nephelometric turbidity units.

(g) "T" means disinfectant contact time in minutes.

(h) "£" means "the sum of" in mathematical calculations.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.02 Definitions.

(a) "Coagulation" means a process using coagulant chemicals and mixing by which colloidal and suspended materials are agglomerated into flocs.

(b) "Conventional filtration " means a series of processes including coagulation, flocculation, sedimentation, and filtration resulting in particulate removal.

(c) "Diatomaceous earth filtration" means a process resulting in particulate removal in which a precoat cake of diatomaceous earth filter media is deposited on a support membrane, and while the water is filtered by passing through the cake on the support membrane, additional filter media is continuously added to the feed water to maintain the permeability of the filter cake.

(d) "Direct filtration" means a series of processes including coagulation and filtration but excluding sedimentation resulting in particulate removal.

(e) "Disinfectant contact time" or T in CT calculations means the time in minutes that it takes for water to move from the point of disinfectant application or the previous point of disinfectant residual measurement to a point before or at the point where residual disinfectant concentration is measured.

(f) "Disinfection" means a process which inactivates pathogenic organisms in water by chemical oxidants or equivalent agents.

(g) "Disinfection sequence" means that segment of a water supply main between point of disinfectant application and the first customer or subsequent point of disinfectant application.

(h) "Filtration" means a process for removing particulate matter from water by passage through porous media.

(i) "Flocculation" means a process to enhance agglomeration or collection of smaller floc particles into larger, more easily settleable particles through gentle stirring by hydraulic or mechanical means.

(j) "Ground water under the direct influence of surface water" means any water beneath the surface of the ground with:

(1) Significant occurrence of insects or other microorganisms, algae, or large-diameter pathogens such as giardia lamblia; or

(2) Significant and relatively rapid shifts in water characteristics such as turbidity, temperature, conductivity, or pH which closely correlate to climatological or surface water conditions.

(k) "High turbidity event" means a series of consecutive days during which at least one turbidity measurement each day exceeds 5 NTU.

(l) "Inactivation ratio" means the ratio of CTcalc to CT99.9, CTcalc/CT99.9.

(m) "Legionella" means a genus of bacteria, some species of which have caused a type of pneumonia called legionnaires disease.

(n) "Point of disinfectant application" is the point where the disinfectant is applied and water downstream of that point is not subject to recontamination by surface water runoff.

(o) "Residual disinfectant concentration", or C in CT calculations, means the concentration of disinfectant measured in mg/l in a representative sample of water.

(p) "Sedimentation" means a process for removal of solids before filtration by gravity or separation.

(q) "Slow sand filtration" means a process involving passage of raw water through a bed of sand at low velocity resulting in particulate removal by physical and biological mechanisms.

(r) "Surface water" means all water which is open to the atmosphere and subject to surface runoff.

(s) "Total inactivation ratio" means the sum of the inactivation ratios, represented by £(CTcalc/CT99.9), calculated by adding together the inactivation ratio for each disinfection sequence in the case of a public water system which applies disinfectants at more than one point prior to the first customer.

(t) "Unusual and unpredictable" means markedly contrasting with historical records, not indicative of generally predominating conditions, and not directly controllable by the water system operator.

(u) "Virus" means a virus of fecal origin which is infectious to humans by waterborne transmission.

(v) "Waterborne disease outbreak" means the occurrence of acute infectious illness, epidemiologically associated with the ingestion of water from a public water system which is deficient in treatment.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97

Env-Ws 380.03 Purpose.

(a) This section establishes criteria under which filtration shall be required as a treatment technique for public water systems supplied by a surface water source and public water systems supplied by a source of ground water under the direct influence of surface water.

(b) These rules establish treatment technique requirements in lieu of maximum contaminant levels for giardia lamblia, viruses, heterotrophic plate count bacteria, legionella, and turbidity.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.04 Filtration Applicability and Efficacy.

(a) Each public water system with a surface water source or a ground water source under the direct influence of surface water shall provide treatment of that source water that complies with these treatment technique requirements.

(b) The treatment technique requirements shall consist of installing and properly operating water treatment processes which reliably achieve the following:

(1) At least 99.9 percent removal and/or inactivation of giardia lamblia cysts between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

(2) At least 99.99 percent removal and/or inactivation of viruses between a point where the raw water is not subject to recontamination by surface water runoff and a point downstream before or at the first customer.

(c) A public water system using a surface water source or a source of ground water under the direct influence of surface water is considered to be in compliance with the requirements of paragraph (a) and (b) of this section if:

(1) It meets the requirements for avoiding filtration in Env-Ws 380.05 and the disinfection requirements in Env-Ws 380.15(f); or

(2) It meets the filtration requirements in Env-Ws 380.20 and the disinfection requirements in Env-Ws 380.15(g).

(d) Each public water system using a surface water source or a ground water source under the direct influence of surface water shall be operated by qualified personnel who meet the requirements of Env-Ws 367.

(e) A management plan shall be submitted to the division as part of any proposal for installation of filtration of surface water. The management plan shall demonstrate the financial and administrative capability of the water system to construct the filtration facilities and to operate the facilities on a continuous basis. Adequacy of this plan in light of the capabilities of the water system shall be a criterion for approval of the filtration proposal by the division.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.05 Criteria for Avoiding Filtration.

(a) The division shall determine which public water systems use groundwater under the direct influence of surface water. This determination shall be based on the definition in Env-Ws 380.02(j).

(b) The division shall determine in the case of each public water system that uses surface water or groundwater under the direct influence of surface water whether filtration is required. This determination shall be based on the criteria in paragraphs (e) and (f) of this section.

(c) A public water system that uses a surface water source shall meet all of the conditions of (e) and (f) below, and shall be subject to (g) below, unless the division has determined, in writing, that filtration is required. A public water system that uses a ground water source under the direct influence of surface water shall meet all of the conditions of (e) and (f) below and shall be subject to (g) below, unless the division has determined, in writing, that filtration is required. If the division determines in writing, that filtration is required, the system shall install filtration and meet the criteria for filtered systems specified in Env-Ws 380.15(g) and Env-Ws 380.20.

(d) Within 18 months of the failure of a system using surface water or a ground water source under the direct influence of surface water to meet any one of the requirements of (e) and (f) below, the system shall install filtration and meet the criteria for filtered systems specified in Env-Ws 380.15(g) and Env-Ws 380.20.

(e) Criteria involving source water quality conditions shall be as follows:

(1) The fecal coliform concentration shall be equal to or less than 20/100 ml, or the total coliform concentration shall be equal to or less than 100/100 ml in representative samples of the source water immediately prior to the first or only point of disinfectant application in at least 90 percent of the measurements made for the 6 previous months that the system served water to the public on an ongoing basis. If a system measures both fecal and total coliforms, the fecal coliform criterion, but not the total coliform criterion, in this paragraph shall be met.

(2) The turbidity level shall not exceed 5 NTU in representative samples of the source

water immediately prior to the first or only point of disinfectant application unless:

a. Any such high turbidity event was caused by circumstances that were unusual and unpredictable; and

b. As a result of any such high turbidity event, there have not been more than two high turbidity events in the past 12 months during which the system served water to the public, or more than 5 high turbidity events in the past 120 months during which the system served water to the public, in which the turbidity level exceeded 5 NTU.

(f) Criteria involving site-specific conditions shall be as follows:

(1) The public water system shall meet the requirements of Env-Ws 380.15(f)(1), (2) and (3) at least 11 of the 12 previous months that the system served water to the public, on an ongoing basis, unless the system fails to meet the requirements during 2 of the 12 previous months that the system served water to the public, and at least one of these failures was caused by circumstances that were unusual and unpredictable.

(2) The public water system shall meet the requirements of Env-Ws 380.15(f)(4) at all times during which the system serves water to the public.

(3) The public water system shall meet the requirements of Env-Ws 380.15(f)(5) at all times during which the system serves water to the public unless any such failure was caused by circumstances that were unusual and unpredictable.

(4) The public water system shall meet the requirements of Env-Ws 380.15(f)(6) on an ongoing basis unless that failure to meet these requirements was not caused by a deficiency in treatment of the source water.

(5) The public water system shall maintain a watershed control program which minimizes the potential for contamination by giardia lamblia cysts and viruses in the source water. The division shall determine whether the watershed control program is adequate to meet this goal with the following criteria:

a. The adequacy of a program to limit potential contamination by giardia lamblia cysts and viruses as follows:

1. The comprehensiveness of the watershed review;

2. The effectiveness of the system's program to monitor and control detrimental activities occurring in the watershed; and

3. The extent to which the water system has maximized land ownership and/or controlled land use within the watershed.

b. The content of the watershed control program, which shall:

1. Characterize the watershed hydrology and land ownership;

2. Identify watershed characteristics and activities which may have an

adverse effect on source water quality; and

3. Monitor the occurrence of activities which may have an adverse effect on source water quality.

c. The capability of the public water system, through ownership and/or written agreements with landowners within the watershed, to control all human activities which may have an adverse impact on the microbiological quality of the source water.

d. The submission of an annual report to the division that:

1. Identifies any special concerns about the watershed and how they are being handled;

2. Describes activities in the watershed that affect water quality; and

3. Projects what adverse activities are expected to occur in the future and describes how the public water system expects to address them.

(6) The public water system shall be subject to an annual on-site inspection to assess the watershed control program and disinfection treatment process.

(7) The division shall conduct the on-site inspection, which shall include the following:

a. A review of the effectiveness of the watershed control program;

b. A review of the physical condition of the source intake and how well it is protected;

c. A review of the system's equipment maintenance program to ensure there is low probability for failure of the disinfection process;

d. An inspection of the disinfection equipment for physical deterioration;

e. A review of operating procedures to ensure that the water system provides for uninterrupted disinfection;

f. A review of data records to ensure that all required tests are being conducted and recorded and disinfection is effectively practiced; and

g. Identification of any improvements which are needed in the equipment, system maintenance and operation, or data collection.

(8) The public water system shall not have been identified as a source of a waterborne disease outbreak, or if it has been so identified, the system shall have been modified sufficiently to prevent another such occurrence, as determined by the division. A determination of the adequacy of modifications shall be based on design standards as set forth in Env-Ws 375.01.

(9) The public water system shall comply with the maximum contaminant level for total coliforms in Env-Ws 315.01 at least 11 months of the 12 previous months that the system served water to the public, on an ongoing basis, unless the division determines that failure to meet this requirement was not caused by a deficiency in treatment of the source water. A determination of the adequacy of treatment of the source water shall be based on design standards as set forth in Env-Ws 375.01.

(10) The public water system shall comply with the requirements for trihalomethanes as set forth in Env-Ws 317.70.

(g) Treatment technique requirement violations under this part shall be as follows:

(1) A system shall be in violation of a treatment technique requirement if:

a. The system fails to meet any one of the criteria in (e) and (f) and/or the division has determined that filtration is required according to (b) above, in writing; and

b. The system fails to install filtration by the date specified in (d) above.

(2) A system that has not installed filtration shall be in violation of a treatment technique requirement if:

a. The turbidity level in a representative sample of the source water immediately prior to the first or only point of disinfection application exceeds 5 NTU; or

b. The system is identified by the division as a source of a waterborne disease outbreak based on an investigation of the timing of onset, pattern and duration of reported incidence, and identified coincidental operational events of the water system associated with the waterborne disease outbreak.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.06 - Env-Ws 380.14 - RESERVED

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.15 Disinfection.

(a) A public water system that uses a surface water source and does not provide filtration treatment shall provide the disinfection treatment specified in (f) below, unless the division determines that filtration is required in writing pursuant to Env-Ws 380.05.

(b) A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment shall provide disinfection treatment specified in (f) below unless the division has determined that filtration is required in writing

according to section Env-Ws 380.05.

(c) A system that uses a surface water source that provides filtration treatment shall provide the disinfection treatment specified in (g) below.

(d) A system that uses a groundwater source under the direct influence of surface water and provides filtration treatment shall provide disinfection treatment as specified in (g) below.

(e) Failure to meet any requirement of this section shall be a treatment technique violation.

(f) Each public water system that does not provide filtration treatment shall provide disinfection treatment as follows:

(1) The disinfection treatment shall be sufficient to ensure at least 99.9 percent inactivation of giardia lamblia cysts and 99.99 percent inactivation of viruses, every day the system serves water to the public, except any one day each month.

(2) Each day a system serves water to the public, the public water system shall calculate the CT value(s) from the system's treatment parameters, using the procedure specified in Env-Ws 380.22(a)(5) and (6), and determine whether this value(s) is sufficient to achieve the specified inactivation rates for giardia lamblia cysts and viruses.

(3) If a system uses a disinfectant other than chlorine, the system shall demonstrate to the division, through the use of on-site disinfection challenge studies or other information, that CT99.9 values other than those specified in Tables 380-8 and 380-9 in Env-Ws 380.22(a)(6) or other operational parameters are adequate to demonstrate that the system is achieving minimum inactivation rates required by this paragraph.

(4) The disinfection system shall have redundant components, including an auxiliary power supply with automatic start-up and alarm to ensure that disinfectant application is maintained continuously while water is being delivered to the distribution system.

(5) The residual disinfectant concentration in the water entering the distribution system shall not be less than 0.2 mg/l for more than 4 hours.

(6) The residual disinfectant concentration in the distribution system shall be as follows:

a. The residual disinfectant concentration measured as total chlorine, combined chlorine, or chlorine dioxide shall not be undetectable in more than 5 percent of the samples each month, for any 2 consecutive months that the system serves water to the public.

b. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as HPC, is deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement.

c. The value "V" in the following formula shall be calculated each month:

$$V = \frac{c + d + e}{a + b} \times 100$$

d. The terms in the formula in clause c. are as follows:

1. a = number of instances where the residual disinfectant concentration is measured;

2. b = number of instances where the residual disinfectant concentration is not measured but HPC is measured;

3. c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

4. d = number of instances where the residual disinfectant concentration is measured but not detected and where the HPC is >500/ml; and

5. e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

e. The value of "V" in clause c. shall not exceed 5 percent in one month for any 2 consecutive months.

(g) Each public water system that provides filtration treatment shall provide disinfection treatment as follows:

(1) The disinfection treatment shall be sufficient to ensure that the total treatment processes of that system achieve at least 99.9 percent inactivation and/or removal of giardia lamblia cysts and at least 99.99 percent inactivation and/or removal of viruses.

(2) The residual disinfectant concentration in the water entering the distribution system shall not be less than 0.2 mg/l for more than 4 hours.

(3) The residual disinfectant concentration shall be as follows:

a. The residual disinfectant concentration measured as total chlorine, combined chlorine, or chlorine dioxide, shall not be undetectable in more than 5 percent of the samples each month, for any 2 consecutive months that the system serves water to the public.

b. Water in the distribution system with a heterotrophic bacteria concentration less than or equal to 500/ml, measured as HPC, shall be deemed to have a detectable disinfectant residual for purposes of determining compliance with this requirement.

c. The value "V" in the following formula shall be calculated each month:

$$V = \frac{c + d + e}{} \times 100$$

a + b

d. The terms in the formula in clause c. are as follows:

1. a = number of instances where the residual disinfectant concentration is measured;

2. b = number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count is measured;

3. c = number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

4. d = number of instances where residual disinfectant concentration is measured but not detected and where the HPC is >500/ml; and

5. e = number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml.

e. The value of "V" in clause c. shall not exceed 5 percent in one month for any 2 consecutive months.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.16 - Env-Ws 380.19 - RESERVED

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.20 Filtration.

(a) A public water system that uses a surface water source or a ground water source under the direct influence of surface water, and does not meet all of the criteria in Env-Ws 380.05(e) and (f) for avoiding filtration, shall provide treatment consisting of both disinfection, as specified in Env-Ws 380.15(g), and filtration treatment which complies with the requirements of (b), (c), (d), or (e) above. Failure to meet any requirement of this section after the date specified in this paragraph shall be a treatment technique violation.

(b) For systems using conventional filtration or direct filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 0.5 NTU in at least 95 percent of the measurements taken each month. The turbidity level of representative samples of a system's filtered water shall at no time exceed 5 NTU.

(c) For systems using slow sand filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month. The turbidity level of representative samples of a system's

filtered water shall at no time exceed 5 NTU.

(d) For systems using diatomaceous earth filtration, the turbidity level of representative samples of a system's filtered water shall be less than or equal to 1 NTU in at least 95 percent of the measurements taken each month. The turbidity level of representative samples of a system's filtered water shall at no time exceed 5 NTU.

(e) A public water system may use a filtration technology not listed in (b) through (d) above if it demonstrates to the division, using pilot plant studies that the alternative filtration technology, in combination with disinfection treatment that meets the requirements of Env-Ws 380.15(g), consistently achieves 99.9 percent removal and/or inactivation of giardia lamblia cysts and 99.99 percent removal and/or inactivation of viruses. For a system that makes this demonstration, the requirements of (c) shall apply.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.21 Analytical Requirements.

(a) The following analytical methods specified in Env-C 300 shall be used to comply with the requirements of Env-Ws 380.05, 380.15, and 380.20:

(1) Fecal coliform concentration;

(2) Total coliform concentration;

(3) Heterotrophic plate count;

(4) Residual disinfectant concentration;

(5) Turbidity;

(6) Temperature; and

(7) pH.

(b) Measurements for pH, temperature, turbidity, and residual disinfectant concentration shall be conducted by operators who are certified under Env-Ws 367.

(c) Measurements for total coliforms, fecal coliforms, and HPC shall be conducted by a laboratory certified to do such analysis by the New Hampshire department of environmental services under Env-C 300.

(d) Until laboratory certification criteria are developed for the analysis of HPC and fecal coliforms, any laboratory certified for total coliform analysis under chapter Env-C 300 is deemed certified for HPC and fecal coliform analysis.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.22 Monitoring Requirements.

(a) Monitoring requirements for systems that do not provide filtration shall be as follows:

(1) A public water system that uses a surface water source and does not provide filtration treatment shall monitor as specified in this paragraph unless the division has determined that filtration is required pursuant to Env 380.05, in which case the system shall monitor according to Env-Ws 375.10 until filtration is in place;

(2) A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment shall monitor as specified in this paragraph beginning 6 months after the division determines that the ground water source is under the direct influence of surface water unless the division has determined that filtration is required pursuant to Env-Ws 380.05, in which case the system shall monitor according to Env-Ws 375.10 until filtration is in place; and

(3) Fecal coliform or total coliform density measurements shall be performed on representative source water samples immediately prior to the first or only point of disinfectant application as follows:

a. Each week the system serves water to the public, the system shall sample for fecal or total coliforms at the minimum frequency specified in Table 380-1:

Table 380-1

Sampling Non-filtered Systems for Coliforms

System Size (persons served) (shall be taken on separate days)	Samples/Week
<500	1
501 - 3,300	2
3,301 - 10,000	3
10,001 - 25,000	4
>25,000	5

b. One fecal or total coliform density measurement shall be made every day the system serves water to the public and the turbidity of the source water exceeds 1 NTU; and

c. The fecal or total coliform density measurements made according to clause b.

shall count toward the weekly coliform sampling requirement required by clause a.

(4) Turbidity measurements as required by Env-Ws 380.05(e)(2) shall be performed on representative grab samples of source water immediately prior to the first or only point of disinfectant application every four hours, or more frequently, that the system serves water to the public. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol recommended by the equipment manufacturer;

(5) The total inactivation ratio for each day that the system is in operation shall be determined based on the CT99.9 values in Tables 380-1 through Table 380-8 of this section, as appropriate; and

(6) The parameters necessary to determine the total inactivation ratio shall be monitored as follows:

a. The temperature of the disinfected water shall be measured at least once per day at each residual disinfectant concentration sampling point;

b. If the system uses chlorine, the pH of the disinfected water shall be measured at least once per day at each chlorine residual disinfectant concentration sampling point;

c. The disinfectant contact time(s) shall be determined for each day during peak hourly flow;

d. The residual disinfectant concentration(s) of the water before or at the first customer shall be measured each day during peak hourly flow;

e. If a system uses a disinfectant other than chlorine, the system shall demonstrate to the division, through the use of on-site disinfection challenge studies or other information that CT99.9 values other than those specified in Tables 380-8 and 380-9 in this section other operational parameters are adequate to demonstrate that the system is achieving the minimum inactivation rates required by Env-Ws 380.15(f)(1);

f. The CT values in Tables 380-2 through 380-7 shall be assumed to achieve greater than a 99.99 percent inactivation of viruses. CT values between the indicated pH values shall be determined by linear interpolation. CT values between the indicated temperatures of different tables shall be determined by linear interpolation. If no interpolation is used, the CT99.9 value at the lower temperature and at the higher pH shall be used;

g. The CT values in Table 380-7 shall be assumed to achieve greater than 99.99 percent inactivation of viruses. CT values between the indicated temperatures shall be determined by linear interpolation. If no interpolation is used, the CT99.9 value at the lower temperature for determining CT99.9 values between indicated

temperatures shall be used; and

h. The CT values in Table 380-8 shall be assumed to achieve greater than 99.99 percent inactivation of viruses only if chlorine is added and mixed in the water prior to the addition of ammonia. If this condition is not met, the system shall demonstrate, based on on-site studies or other information that the system is achieving at least 99.99 percent inactivation of viruses. CT values between the indicated temperatures shall be determined by linear interpolation. If no interpolation is used, the CT99.9 value at the lower temperature for determining CT99.9 values between indicated temperatures shall be used.

(b) The CT values for giardia lamblia cysts inactivation by free chlorine at 0.5° C or lower shall be as stated in Table 380-2 below:

Table 380-2

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION

OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 0.5° C OR LOWER

	pH						
Residual (mg/l)	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
<0.4	137	163	195	237	277	329	390
0.6	141	168	200	239	286	342	407
0.8	145	172	205	246	295	354	422
1.0	148	176	210	253	304	365	437
1.2	152	180	215	259	313	376	451
1.4	155	184	221	266	321	387	464
1.6	157	189	226	273	329	397	477
1.8	162	193	231	279	338	407	489
2.0	165	197	236	286	346	417	500
2.2	169	201	242	297	353	426	511
2.4	172	205	247	298	361	435	522
2.6	175	209	252	304	368	444	533

2.8	178	213	257	310	375	452	543
3.0	181	217	261	316	382	460	552

(c) The CT values for giardia lamblia cysts inactivated by free chlorine at 5.0° C shall be as stated in Table 380-3 below:

Table 380-3

CT VALUES (CT 99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA

LAMBLIA CYSTS BY FREE CHLORINE AT 5.0° C

pH

Free Residual (mg/l)	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
<0.4	97	117	139	166	198	236	279
0.6	100	120	143	171	204	244	291
0.8	103	122	146	175	210	252	301
1.0	105	125	149	179	216	260	312
1.2	107	127	152	183	221	267	320
1.4	109	130	155	187	227	274	329
1.6	111	132	158	192	232	281	337
1.8	114	135	162	196	238	287	345
2.0	116	138	165	200	243	294	353
2.2	118	140	169	204	248	300	361
2.4	120	143	172	209	253	306	368
2.6	122	146	175	213	258	312	375
2.8	124	148	178	217	263	318	382
3.0	126	151	182	221	268	324	389

(d) The CT values for giardia lamblia cysts inactivated by free chlorine at 10° C shall be as stated in Table 380-4 below:

Table 380-4

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 10° C

Free Residual	pH						
(mg/l)	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	73	88	104	125	149	177	209
0.6	75	90	107	128	153	182	218
0.8	78	92	110	131	158	189	226
1.0	79	94	112	134	162	195	234
1.2	80	95	112	134	162	195	234
1.4	82	98	116	140	170	206	247
1.6	83	99	119	144	174	211	253
1.8	86	101	122	147	179	215	259
2.0	87	104	124	150	182	221	265
2.2	89	105	127	153	186	225	271
2.4	90	107	129	157	190	230	276
2.6	92	110	131	160	194	234	281
2.8	93	111	134	163	197	239	287
3.0	95	113	137	166	201	243	292

(e) The CT value for giardia lamblia cysts inactivated by free chlorine at 15° C shall be as stated in Table 380-5 below:

Table 380-5

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 15 ^{o} C

pH

Free

Residual

(mg/l)	≤6.0	6.5	7.0	7.5	8.0	8.5	≤9.0
<0.4	49	59	71	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	60	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

(f) The CT value for giardia lamblia cysts inactivated by free chlorine at 20° C shall be as stated in Table 380-6 below:

Table 380-6

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA

LAMBLIA CYSTS BY FREE CHLORINE AT 20° C

pH

Free

Residual

(mg/l)	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	49	59	71	83	99	118	140
0.6	50	60	72	86	102	122	146
0.8	52	61	73	88	105	126	151
1.0	53	63	75	90	108	130	156
1.2	54	64	76	92	111	134	160
1.4	55	65	78	94	114	137	165
1.6	56	66	79	96	116	141	169
1.8	57	68	81	98	119	144	173
2.0	58	69	83	100	122	147	177
2.2	59	70	85	102	124	150	181
2.4	61	72	86	105	127	153	184
2.6	61	73	88	107	129	156	188
2.8	62	74	89	109	132	159	191
3.0	63	76	91	111	134	162	195

(g) The CT for giardia lamblia cysts inactivated by free chlorine at 25° C shall be as stated in Table 380-7 below:

Table 380-7

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY FREE CHLORINE AT 25° C AND HIGHER

	pH						
Free Residual (mg/l)	<6.0	6.5	7.0	7.5	8.0	8.5	<9.0
<0.4	24	29	35	42	50	59	70

0.6	25	30	36	43	51	61	73
0.8	26	31	37	44	53	63	75
1.0	26	31	37	45	54	65	78
1.2	27	32	38	46	55	67	80
1.4	27	33	39	47	57	69	82
1.6	28	33	40	48	58	70	84
1.8	29	34	41	49	60	72	86
2.0	29	35	41	50	61	74	88
2.2	30	35	42	51	62	75	90
2.4	30	36	43	52	63	77	92
2.6	31	37	44	53	65	78	94
2.8	31	37	45	54	66	80	96
3.0	32	38	46	55	67	81	97

(h) The CT values for giardia lamblia cysts inactivated by chlorine dioxide and ozone shall be as stated in Table 380-8, below:

Table 380-8

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORINE DIOXIDE AND OZONE

	Temperature					
	<1 °C	5 °C	10 °C	15 °C	20 °C	>25 °C
Chlorine dioxide	63	26	23	19	15	11
Ozone	2.9	1.9	1.4	0.95	0.72	0.48

(i) The CT values for giardia lamblia cysts inactivated by chloramines at pH values 6 to 9 shall be as stated in Table 380-9 below:

Table 380-9

CT VALUES (CT99.9) FOR 99.9 PERCENT INACTIVATION OF GIARDIA LAMBLIA CYSTS BY CHLORAMINES AT pH VALUES 6 TO 9

Temperature					
<1 °C	5 °C	10 °C	15 °C	20 °C	>25 °C
3,800	2,200	1,850	1,500	1,100	750

(7) The total inactivation ratio shall be calculated as follows:

a. If the system uses only one point of disinfectant application, the system shall determine the total inactivation ratio based on either of the following two methods:

1. One inactivation ratio, CTcalc/CT99.9, shall be determined before or at the first customer during peak hourly flow and if the CTcalc/CT99.9 > 1.0, the 99.9 percent Giardia lamblia inactivation requirement has been achieved; or

2. Successive CTcalc/CT99.9 values, representing sequential inactivation ratios, shall be determined between the point of disinfectant application and a point before or at the first customer during peak hourly flow.

b. Under a.2., the following method shall be used to calculate the total inactivation ratio:

1. The (CTcalc/CT99.9) shall be determined for each sequence;

2. The (CTcalc/CT99.9) values shall be added together (£(CTcalc/CT99.9)); and

3. If £(CTcalc/CT99.9) > 1.0, the 99.9 percent giardia lamblia inactivation requirement shall have been achieved.

c. If the system uses more than one point of disinfectant application before or at the first customer, the system shall determine the CT value of each disinfection sequence immediately prior to the next point of disinfectant application during peak hourly flow. The CTcalc/CT99.9 value of each sequence and £(CTcalc/CT99.9) shall be calculated using the method in paragraph b.1. through 3. of this section to determine if the system is in compliance with Env-Ws 380.15(f).

(8) Monitoring of residual disinfectant concentration of the water entering the distribution system shall be as follows:

a. The residual disinfectant concentration shall be monitored continuously, and the lowest value shall be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours shall be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment;

b. Systems serving 3,300 or fewer persons may take grab samples in lieu of

providing continuous monitoring on an ongoing basis at the frequencies prescribed in Table 380-10 below:

Table 380-10

Distribution Disinfectant Residual Samples For Unfiltered Systems

System by population	Samples/day
<500	1
501 - 1,100	2
1,001 - 2,500	3
2,501 - 3,300	4

c. The day's samples taken according to b. shall not be taken at the same time; and

d. If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system shall take a grab sample every 4 hours until the residual concentration is equal to or greater than 0.2 mg/l.

(9) Monitoring of residual disinfectant in the distribution system shall be as follows:

a. The residual disinfectant concentration shall be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Env-Ws 325.02. Except that a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, may take disinfectant residual samples at points other than the total coliform sampling points if the division determines that such points are more representative of disinfected water quality within the distribution system.

b. The division shall make this determination based on the following criteria:

1. The general hydraulics of the distribution system based on water demand patterns;

2. The relative quantity of water supplied from the various water sources;

3. The scheduling of supply from pumped sources; and

4. Historic disinfectant concentration at various locations in the distribution system as determined from water supply records.

c. Heterotrophic bacteria, measured as heterotrophic plate count may be measured in lieu of residual disinfectant concentration.

(b) Monitoring requirements for systems using filtration treatment shall be as follows:

(1) A public water system that uses a surface water source or a ground water source under the influence of surface water and provides filtration treatment shall monitor in accordance with this paragraph;

(2) Turbidity measurements shall be as follows:

a. Measurement as required by Env-Ws 380.20 shall be performed on representative samples of the system's filtered water every 4 hours, or more frequently, that the system serves water to the public;

b. A public water system may substitute continuous turbidity monitoring for grab sample monitoring if it validates the continuous measurement for accuracy on a regular basis using a protocol recommended by the equipment manufacturer;

c. For any systems using slow sand filtration or filtration treatment other than conventional treatment, direct filtration, or diatomaceous earth filtration, the division shall reduce the sampling frequency to once per day if it determines that less frequent monitoring is sufficient to indicate effective filtration performance;

d. For systems serving 500 or fewer persons, the division shall reduce the turbidity sampling frequency to once per day, regardless of the type of filtration treatment used, if the division determines that less frequent monitoring is sufficient to indicate effective filtration performance;

e. The determination of sufficiency of less frequent monitoring in paragraphs c. and d. shall be based on the following criteria:

1. The capability of the water system to maintain residual disinfectant concentration in water entering the distribution system in accordance with Env-Ws 380.15(g)(2);

2. The capability of the water system to maintain detectable residual disinfectant concentration in the distribution system or otherwise comply with the requirements of Env-Ws 380.15(g)(3); and

3. The capability of the water system to meet the turbidity requirements of Env-Ws 380.20.

(3) The residual disinfectant concentration of the water entering the distribution system shall be monitored as follows:

a. The residual shall be monitored continuously, and the lowest value shall be recorded each day, except that if there is a failure in the continuous monitoring equipment, grab sampling every 4 hours shall be conducted in lieu of continuous monitoring, but for no more than 5 working days following the failure of the equipment;

b. Systems serving 3,300 or fewer persons may take grab samples in lieu of

providing continuous monitoring on an ongoing basis at the frequencies each day prescribed in Table 380-11 below:

Table 380-11

Distribution Disinfectant Residual Sampling For Filtered Systems

System size by population	Samples/day
<500	1
501 - 1,000	2
1,001 - 2,500	3
2,501 - 3,300	4

c. The day's samples taken according to paragraph b. shall not be taken at the same time; and

d. If at any time the residual disinfectant concentration falls below 0.2 mg/l in a system using grab sampling in lieu of continuous monitoring, the system shall take a grab sample every 4 hours until the residual disinfectant concentration is equal to or greater than 0.2 mg/l.

(4) The residual disinfectant concentration in the distribution system shall be as follows:

a. The residual disinfectant concentration shall be measured at least at the same points in the distribution system and at the same time as total coliforms are sampled, as specified in Env-Ws 325.02, except that a public water system which uses both a surface water source or a ground water source under direct influence of surface water, and a ground water source, may take disinfectant residual samples at points other than the total coliform sampling points if the division determines that such points are more representative of disinfected water quality within the distribution system;

b. The division shall make this determination based on the following criteria:

1. The general hydraulics of the distribution system based on water demand patterns;

2. The relative quantity of water supplied from the various water sources;

3. The scheduling of supply from pumped sources; and

4. Historic disinfectant concentration at various locations in the distribution system as determined from water supply records.

b. Heterotrophic bacteria, measured as heterotrophic plate count may be measured in lieu of residual disinfectant concentration.

Source. (See Revision Note at chapter heading for Env-Ws 300) #6521, eff 6-4-97

Env-Ws 380.23 - Env-Ws 380.24 - RESERVED

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.25 Reporting and Recordkeeping Requirements.

(a) Reporting and recordkeeping requirements for systems that do not provide filtration shall be as follows:

(1) A public water system that uses a surface water source and does not provide filtration treatment shall report monthly to the division the information specified in this paragraph unless the division has determined that filtration is required in writing pursuant to Env-Ws 380.05 (b), in which case the system shall report according to Env-Ws 375.10 until filtration is in place;

(2) A public water system that uses a ground water source under the direct influence of surface water and does not provide filtration treatment shall report monthly to the division the information specified in this paragraph beginning 6 months after the division determines that the ground water source is under the direct influence of surface water unless the division has determined that filtration is required in writing pursuant to Env-Ws 380.05(b), in which case the system shall report according to Env-Ws 375.10 until filtration is in place;

(3) Source water quality information shall be reported to the division within 10 days after the end of each month that the system serves water to the public as follows:

a. The cumulative number of months for which results are reported;

b. The number of fecal and/or total coliform samples, whichever are analyzed during the month, the dates of sample collection, and the dates when the turbidity level exceeded 1 NTU. If a system monitors for both fecal coliforms and total coliforms, only fecal coliforms shall be reported;

c. The number of samples during the month that had equal to or less than 20/100 ml fecal coliforms and/or equal to or less than 100/100 ml total coliforms, whichever are analyzed;

d. The cumulative number of fecal or total coliform samples, whichever are analyzed, during the previous 6 months the system served water to the public;

e. The cumulative number of samples that had equal to or less than 20/100 ml

fecal coliforms or equal to or less than 100/100 ml total coliforms, whichever are analyzed, during the previous 6 months the system served water to the public;

f. The percentage of samples that had equal to or less than 20/100 ml fecal coliforms or equal to or less than l00/l00 ml total coliforms, whichever are analyzed, during the previous 6 months the system served water to the public;

g. The maximum turbidity level measured during the month, the date(s) of occurrence for any measurement(s) which exceeded 5 NTU, and the date(s) the occurrence(s) was reported to the division;

h. For the first 12 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after one year of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 12 months the system served water to the public; and

i. For the first 120 months of recordkeeping, the dates and cumulative number of events during which the turbidity exceeded 5 NTU, and after 10 years of recordkeeping for turbidity measurements, the dates and cumulative number of events during which the turbidity exceeded 5 NTU in the previous 120 months the system served water to the public.

(4) Disinfection information specified in Env-Ws 380.22(a) shall be reported to the division within 10 days after the end of each month the system serves water to the public as follows:

a. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system;

b. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the division was notified of the occurrence;

c. The daily residual disinfectant concentration(s), in mg/l, and disinfectant contact time(s), in minutes, used for calculating the CT value(s);

d. If chlorine is used, the daily measurement(s) of pH of disinfected water following each point of chlorine disinfection;

e. The daily measurement(s) of water temperature in ° C following each point of disinfection;

f. The daily CTcalc and CTcalc/CT99.9 values for each disinfectant measurement or sequence and the sum of all CTcalc/CT99.9 values, £(CTcalc/CT99.9), before or at the first customer;

g. The daily determination of whether disinfection achieves adequate giardia cyst and virus inactivation, i.e., whether (CTcalc/CT99.9) is at least 1.0 or, where disinfectants other than chlorine are used, other indicator conditions are met; and

h. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to Env-Ws 325:

1. Number of instances where the residual disinfectant concentration is measured;

2. Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count is measured;

3. Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

4. Number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;

5. Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; and

6. For the current and previous month the system served water to the public, the value of "V" calculated in Env-Ws 380.15(e)(6).

i. A system need not report the data listed in paragraphs (a)(4)a. and c. through f. of this section if all data listed in paragraphs (a)(4)a. through h. of this section remain on file at the system, and the division determines that:

1. The system has submitted to the division all the information required by (a)(4)a. through h. of this section for at least 12 months; and

2. The system is not required to provide filtration treatment.

(5) No later than 10 days after the end of each calendar year, each system shall provide to the division a report which summarizes its compliance with all watershed control program requirements specified in Env-Ws 380.05(f)(5);

(6) No later than 10 days after the end of each calendar year, the division shall provide a copy of its report on the on-site inspection conducted during that year pursuant to Env-Ws 380.05(f)(6) to the public water system;

(7) Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, shall report that occurrence to the division as soon as possible, but no later than by the end of the next business day after such discovery;

(8) If at any time the turbidity exceeds 5 NTU, the system shall inform the division as soon as possible, but no later than the end of the next business day after such discovery; and

(9) If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system shall notify the division as soon as possible, but no later than by the end of the next business day after such discovery. The system also

shall notify the division by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

(b) A public water system that uses a surface water source or a ground water source under the direct influence of surface water and provides filtration treatment shall report monthly to the division the information specified in this paragraph as follows:

(1) Turbidity measurements as required by Env-Ws 380.22(b)(2) shall be reported within 10 days after the end of each month the system serves water to the public as follows:

a. The total number of filtered water turbidity measurements taken during the month;

b. The number and percentage of filtered water turbidity measurements taken during the month which are less than or equal to the turbidity limits specified in Env-Ws 380.20 for the filtration technology being used; and

c. The date and value of any turbidity measurements taken during the month which exceed 5 NTU.

(2) Disinfection information specified in Env-Ws 380.22(b) shall be reported to the division within 10 days after the end of each month the system serves water to the public as follows:

a. For each day, the lowest measurement of residual disinfectant concentration in mg/l in water entering the distribution system;

b. The date and duration of each period when the residual disinfectant concentration in water entering the distribution system fell below 0.2 mg/l and when the division was notified of the occurrence; and

c. The following information on the samples taken in the distribution system in conjunction with total coliform monitoring pursuant to Env-Ws 325:

1. Number of instances where the residual disinfectant concentration is measured;

2. Number of instances where the residual disinfectant concentration is not measured but heterotrophic bacteria plate count is measured;

3. Number of instances where the residual disinfectant concentration is measured but not detected and no HPC is measured;

4. Number of instances where no residual disinfectant concentration is detected and where HPC is >500/ml;

5. Number of instances where the residual disinfectant concentration is not measured and HPC is >500/ml; and

6. For the current and previous month the system serves water to the

public, the value of "V" calculated in Env-Ws 380.15(g)(3)c. and d.;

d. A system need not report the data listed in (b)(2)a. of this section if all data listed in paragraphs (b)(2)a. through (b)(2)c. of this section remain on file at the system and the division determines that the system has submitted all the information required by paragraphs (b)(2)a. through c. of this section for at least 12 months;

(3) Each system, upon discovering that a waterborne disease outbreak potentially attributable to that water system has occurred, shall report that occurrence to the division as soon as possible, but no later than by the end of the next business day after such discovery;

(4) If at any time the turbidity exceeds 5 NTU, the system shall inform the division as soon as possible, but no later than the end of the next business day after such discovery; and

(5) If at any time the residual falls below 0.2 mg/l in the water entering the distribution system, the system shall notify the division as soon as possible, but no later than by the end of the next business day after such discovery. The system also shall notify the division by the end of the next business day whether or not the residual was restored to at least 0.2 mg/l within 4 hours.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)

Env-Ws 380.26 Variances and Exemptions.

(a) No variances from the requirements of Env-Ws 380 shall be permitted.

(b) No exemptions from the requirements of Env-Ws 380.15(e)(5) and Env-Ws 380.15(g)(2) shall be permitted.

Source. #5098, eff 3-18-91, EXPIRED 3-18-97

New. #6521, eff 6-4-97 (See Revision Note at chapter heading for Env-Ws 300)